Image analysis of conformation dynamics of concentrated DNA solutions

AUTHOR(S):

SATO, Hiroki; MASUBUCHI, Yuichi

CITATION:

SATO, Hiroki ...[et al]. Image analysis of conformation dynamics of concentrated DNA solutions. 物性研究 2006, 87(1): 141-141

ISSUE DATE:

2006-10-20

URL:

http://hdl.handle.net/2433/110608

Image analysis of conformation dynamics of concentrated DNA solutions

Dept. of Applied Chem., Tokyo Univ. of Agri. & Tech. Hiroki SATO[1]

Dept. of Applied Chem., Tokyo Univ. of Agri. & Tech. and JST. Yuichi MASUBUCHI

希薄溶液，及び濃厚溶液中におけるDNAのダイナミクスの様子を蛍光顕微鏡法により直接観察した．得られた蛍光像より分子の軌跡を解析しDNAの形態変化について議論した．

Though it has been established that polymer dynamics in entangled state can be described by using tube-like constraint [1], microscopic nature of the entanglement has not been elucidated. To extract 'the tube', analysis of chain dynamics in entangled state is required and visualization of single DNA by fluorescent microscopy [2,3] is a promising way. In this work, conformational dynamics of DNA in solutions with various concentrations was analyzed. Figure 1 shows typical snapshots and integrated images on time for dilute and entangled solutions. It is indicated that in the snapshots no concentration effect is observed while in the integrated images distribution of the fluorescence is much larger in the dilute condition than the entangled one reflecting difference on the mobility and conformational relaxation.

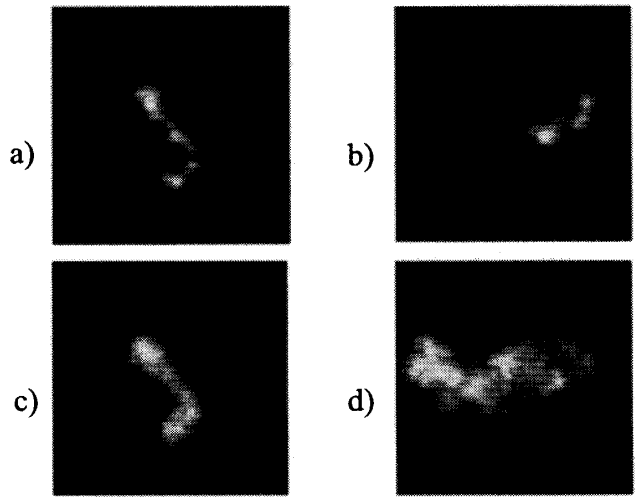

Figure 1: Snapshots (Figs a and b) and time integrated images (Fig c and d) in entangled (Figs a and c) and isolated (Fig c and d) regime.

References

[1] M. Doi and S. F. Edwards, *The Theory of Polymer Dynamics.* (Clarendon, Oxford, 1986)

[2] A. Kishino and T. Yanagida. Nature. 334 (1988), 749

[3] Thomas T. Perkins, Douglas E. Smith, Steven Chu. Science.264 (1994), 81

[1]E-mail: sugar116@rheo.chem.tuat.ac.jp